UNITED STATES PATENT OFFICE.

C. T. JACKSON AND WM. T. G. MORTON, OF BOSTON, MASSACHUSETTS; SAID C. T. JACKSON ASSIGNOR TO WM. T. G. MORTON.

IMPROVEMENT IN SURGICAL OPERATIONS.

Specification forming part of Letters Patent No. **4,848**, dated November 12, 1846.

To all whom it may concern:

Be it known that we, CHARLES T. JACKSON and WILLIAM T. G. MORTON, of Boston, in the county of Suffolk and State of Massachusetts, have invented or discovered a new and useful Improvement in Surgical Operations on Animals, whereby we are enabled to accomplish many, if not all, operations, such as are usually attended with more or less pain and suffering, without any or with very little pain to or muscular action of persons who undergo the same; and we do hereby declare that the following is a full and exact description of our said invention or discovery.

It is well known to chemists that when alcohol is submitted to distillation with certain acids peculiar compounds, termed "ethers," are formed, each of which is usually distinguished by the name of the acid employed in its preparation. It has also been known that the vapors of some, if not all, of these chemical distillations, particularly those of sulphuric ether, when breathed or introduced into the lungs of an animal have produced a peculiar effect on its nervous system, one which has been supposed to be analogous to what is usually termed "intoxication." It has never to our knowledge been known until our discovery that the inhalation of such vapors (particularly those of sulphuric ether) would produce insensibility to pain, or such a state of quiet of nervous action as to render a person or animal incapable to a great extent, if not entirely, of experiencing pain while under the action of the knife or other instrument of operation of a surgeon calculated to produce pain. This is our discovery, and the combining it with or applying it to any operation of surgery for the purpose of alleviating animal suffering, as well as of enabling a surgeon to conduct his operation with little or no struggling or muscular action of the patient and with more certainty of success, constitutes our invention. The nervous quiet and insensibility to pain produced on a person is generally of short duration. The degree or extent of it or time which it lasts depends on the amount of ethereal vapor received into the system and the constitutional character of the person to whom it is administered. Practice will soon acquaint an experienced surgeon with the amount of ethereal vapor to be administered to persons for the accomplishment of the surgical operation or operations required in their respective cases. For the extraction of a tooth the individual may be thrown into the insensible state, generally speaking, only a few minutes. For the removal of a tumor or the performance of the amputation of a limb it is necessary to regulate the amount of vapor inhaled to the time required to complete the operation.

Various modes may be adopted for conveying the ethereal vapor into the lungs. A very simple one is to saturate a piece of cloth or sponge with sulphuric ether, and place it to the nostrils or mouth, so that the person may inhale the vapors. A more effective one is to take a glass or other proper vessel, like a common bottle or flask, and place in it a sponge saturated with sulphuric ether. Let there be a hole made through the side of the vessel for the admission of atmospheric air, which hole may or may not be provided with a valve opening downward, or so as to allow air to pass into the vessel, a valve on the outside of the neck opening upward, and another valve in the neck and between that last mentioned and the body of the vessel or flask, which latter valve in the neck should open toward the mouth of the neck or bottle. The extremity of the neck is to be placed in the mouth of the patient, and his nostrils stopped or closed in such manner as to cause him to inhale air through the bottle, and to exhale it through the neck and out of the valve on the outside of the neck. The air thus breathed, by passing in contact with the sponge, will be charged with the ethereal vapors, which will be conveyed by it into the lungs of the patient. This will soon produce the state of insensibility or nervous quiet required.

In order to render the ether agreeable to various persons, we often combine it with one or more essential oils having pleasant perfumes. This may be effected by mixing the ether and essential oil and washing the mixture in water. The impurities will subside, and the ether, impregnated with the perfume, will rise to the top of the water. We sometimes combine a narcotic preparation—such as opium or mor-

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phine—with the ether. This may be done by any way known to chemists by which a combination of ethereal and narcotic vapors may be produced.

After a person has been put into the state of insensibility, as above described, a surgical operation may be performed upon him without, so far as repeated experiments have proved, giving to him any apparent or real pain, or so little in comparison to that produced by the usual process of conducting surgical operations as to be scarcely noticeable. There is very nearly, if not entire, absence of all pain. Immediately or soon after the operation is completed a restoration of the patient to his usual feelings takes place without, generally speaking, his having been sensible of the performance of the operation.

From the experiments we have made we are led to prefer the vapors of sulphuric ether to those of muriatic or other kind of ether; but any such may be employed which will properly produce the state of insensibility without any injurious consequences to the patient.

We are fully aware that narcotics have been administered to patients undergoing surgical operations, and, as we believe, always by introducing them into the stomach. This we consider in no respect to embody our invention, as we operate through the lungs and air-passages, and the effects produced upon the patient are entirely or so far different as to render the one of very little while the other is of immense utility. The consequences of the change are very considerable, as an immense amount of human or animal suffering can be prevented by the application of our discovery.

What we claim as our invention is—

The hereinbefore-described means by which we are enabled to effect the above highly-important improvement in surgical operations—viz., by combining therewith the application of ether or the vapor thereof—substantially as above specified.

In testimony whereof we have hereto set our signatures this 27th day of October, A. D. 1846.

CHARLES T. JACKSON.
WM. T. G. MORTON.

Witnesses:
R. H. EDDY,
W. H. LEIGHTON.

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